

Title (en)  
Nondestructive detection of anomalies (foreign objects, anomalous dimensions) of an engine for example by means of computed tomography

Title (de)  
Zerstörungsfreie Prüfung einer Maschine auf bestimmte Defekte (Fremdkörper, anomale Abmessungen) z.B. mithilfe von Computertomografie

Title (fr)  
Détection non destructive de certaines anomalies (corps étrangers, dimensions anomales) d'un engin par exemple au moyen de tomodensitométrie

Publication  
**EP 2226609 A3 20101208 (EN)**

Application  
**EP 10151885 A 20100128**

Priority  
US 36345809 A 20090130

Abstract (en)  
[origin: US2010194749A1] A method for non-destructive examination of components within an assembly is described. The method includes producing an image of at least a portion of the assembly, extracting a point cloud of the image, registering the point cloud to a CAD coordinate system, and determining points in the point cloud of the image that are more than a selected distance from surfaces on a corresponding CAD model utilizing the same CAD coordinate system. The method also includes utilizing the determined points to detect the presence of anomalies within the assembly.

IPC 8 full level  
**G01B 15/00** (2006.01); **G01M 99/00** (2011.01); **G01N 23/04** (2006.01); **G06T 7/00** (2006.01)

CPC (source: EP US)  
**G01N 23/046** (2013.01 - EP US); **G06T 7/001** (2013.01 - EP US); **G01N 2223/419** (2013.01 - EP US); **G01N 2223/63** (2013.01 - EP US);  
**G06T 2207/10081** (2013.01 - EP US); **G06T 2207/30164** (2013.01 - EP US)

Citation (search report)  

- [XY] EP 1808813 A2 20070718 - GEN ELECTRIC [US]
- [XI] DE 102005032687 A1 20070111 - ZEISS IND MESSTECHNIK GMBH [DE]
- [XI] M. SIMON AND C. SAUERWEIN: "Quality control of Light Metal Castings by 3D Computed Tomography", PROCEEDINGS OF THE 15TH WORLD CONFERENCE ON NONDESTRUCTIVE TESTING (WCNDT), ROMA (ITALY) 15-21 OCTOBER 2000, WITH EXHIBITION, 15 October 2000 (2000-10-15) - 21 October 2000 (2000-10-21), XP002587968, Retrieved from the Internet <URL:<http://www.ndt.net/article/wcndt00/papers/idn730/idn730.htm>> [retrieved on 20100617]
- [XI] CHRISTOF REINHART, C. POLIWODA, T. GUENTHER, W. ROEMER, S. MAASS, C. GOSCH: "MODERN VOXEL BASED DATA AND GEOMETRY ANALYSIS SOFTWARE TOOLS FOR INDUSTRIAL CT", PROCEEDINGS OF THE 16TH WCNDT 2004 - WORLD CONFERENCE ON NDT, AUG 30 - SEP 3, 2004, MONTREAL, CANADA, 30 August 2004 (2004-08-30) - 3 September 2004 (2004-09-03), XP002587969, Retrieved from the Internet <URL:[http://www.ndt.net/article/wcndt2004/pdf/radiography/566\\_reinhart.pdf](http://www.ndt.net/article/wcndt2004/pdf/radiography/566_reinhart.pdf)> [retrieved on 20100617]
- [XI] STANLEY JAMES H ET AL: "Reverse engineering and rapid prototyping for solid free-form fabrication", PROCEEDINGS OF THE INTERNATIONAL SOCIETY FOR OPTICAL ENGINEERING (SPIE), SPIE, USA LNKD- DOI:10.1117/12.213545, vol. 2455, 1 January 1995 (1995-01-01), pages 306 - 311, XP002444031, ISSN: 0277-786X
- [XI] MARK BLIEK: "Geometric Inspection of Small Components with CT-scanners", 15 March 2007 (2007-03-15), XP002587970, Retrieved from the Internet <URL:[http://www10.dcccafe.com/link/display\\_detail.php?link\\_id=18439](http://www10.dcccafe.com/link/display_detail.php?link_id=18439)> [retrieved on 20100617]
- [XJ] JOCHEN HILLER, STEFAN KASPERL, UWE HILPERT, MARKUS BARTSCHER: "Koordinatenmessung mit industrieller Röntgen-Computertomografie (Coordinate Measuring with Industrial X-Ray Computed Tomography)", TECHNISCHES MESSEN, vol. 74, no. 11, 1 January 2007 (2007-01-01), pages 553 - 564, XP002587971, ISSN: 0171-8096, DOI: 10.1524/teme.2007.74.11.553
- [XI] BARTSCHER M ET AL: "Computed tomography: a highly potential tool for industrial quality control and production near measurements", VDI BERICHTE, DUESSELDORF, DE, vol. 1860, 1 January 2004 (2004-01-01), pages 477 - 482, 791,7, XP009139887, ISSN: 0083-5560, Retrieved from the Internet <URL:<http://www.den.rcast.u-tokyo.ac.jp/conv/wiki/wiki.cgi?action=ATTACH&page=%B0%D1%B0%F7%B2%F1%B3%AB%BA%C5%B5%AD%CF%BF%A1%A6%CD%BD%C4%EA&file=ptb1.pdf>> [retrieved on 20101011]
- [XI] XAVER EDELMANN, ALEXANDER FLISCH, RALF SCHINDEL ET AL.: "Computertomografie für Makro- und Mikrostrukturen, Beispiele aus Technik, Wissenschaft, Medizin, Archäologie und Kultur", April 2008 (2008-04-01), XP002605129, Retrieved from the Internet <URL:<http://www.ndt.net/article/dgzfp2008/Inhalt/Festvortrag.pdf>> [retrieved on 20101011]
- [XI] ALEXANDER FLISCH: "Industrielle Computertomographie, Formerfassung und Defekterkennung", MQ MANAGEMENT UND QUALITÄT, vol. 6, 2007, pages 34 - 36, XP002605130, Retrieved from the Internet <URL:[http://www.saq.ch/fileadmin/user\\_upload/mq/downloads/mq\\_2007\\_06\\_flisch.pdf](http://www.saq.ch/fileadmin/user_upload/mq/downloads/mq_2007_06_flisch.pdf)> [retrieved on 20101011]
- [Y] H-R LEE ET AL: "DEVELOPMENT OF METROLOGICAL NDE METHODS FOR MICROTURBINES CERAMIC COMPONENTS", INTERNET CITATION, 11 May 2000 (2000-05-11), XP002444032, Retrieved from the Internet <URL:[http://www.ornl.gov/sci/de\\_materials/documents/ceramic\\_reliability/Le e\\_Devel\\_%20Metro\\_NDE\\_Methods-ASME-2000.pdf](http://www.ornl.gov/sci/de_materials/documents/ceramic_reliability/Le e_Devel_%20Metro_NDE_Methods-ASME-2000.pdf)> [retrieved on 20070724]
- [Y] LEE H-R ET AL: "Dimensional analysis of ceramic rotors by using X-ray computed tomography (XCT)", CERAMIC ENGINEERING AND SCIENCE PROCEEDINGS 2000 AMERICAN CERAMIC SOC, vol. 21, no. 3, 2000, pages 117 - 124, XP002605131

Cited by  
CN109465753A; CN116882035A; US11761910B2

Designated contracting state (EPC)  
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO SE SI SK SM TR

Designated extension state (EPC)  
AL BA RS

DOCDB simple family (publication)  
**US 2010194749 A1 20100805**; CA 2691317 A1 20100730; EP 2226609 A2 20100908; EP 2226609 A3 20101208; JP 2010175541 A 20100812

DOCDB simple family (application)  
**US 36345809 A 20090130**; CA 2691317 A 20100128; EP 10151885 A 20100128; JP 2010014928 A 20100127